



## Phase equilibria in the SrO - Sc<sub>2</sub>O<sub>3</sub> - CuO system with emphasis on the Sr<sub>14</sub>Cu<sub>24</sub>O<sub>41</sub>-phase (poster)

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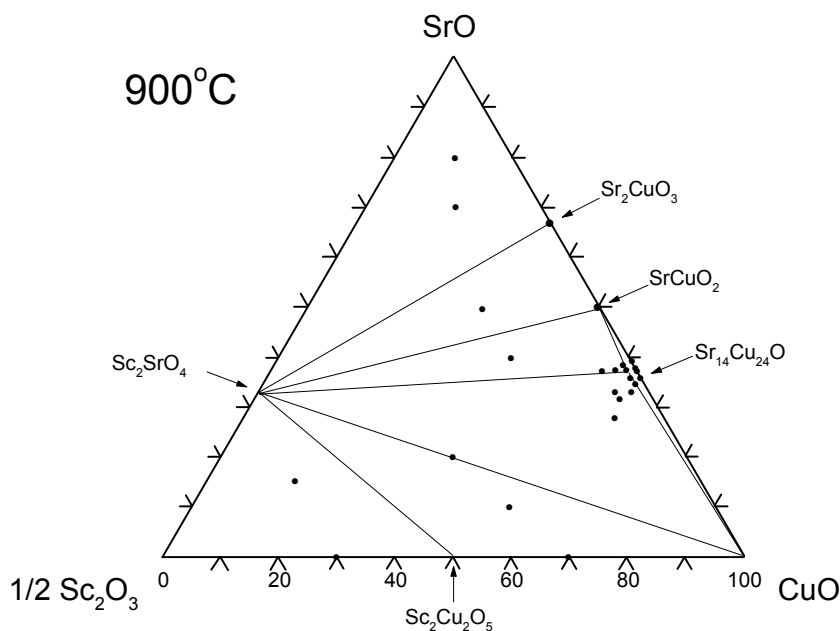
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# PHASE EQUILIBRIA IN THE $\text{SrO} - \text{Sc}_2\text{O}_3 - \text{CuO}$ SYSTEM WITH EMPHASIS ON THE $\text{Sr}_{14}\text{Cu}_{24}\text{O}_{41-\delta}$ PHASE

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The sub-solidus phase relations in the  $\text{Sc}_2\text{O}_3 - \text{SrO} - \text{CuO}$  system were determined at  $900^\circ\text{C}$  in air (see Fig. 1). Like in the case of  $\text{SRE}_2\text{O}_3 - \text{SrO} - \text{CuO}$  systems with SRE = small rare-earth elements, no ternary compound was formed. However, the  $\text{Sc}_2\text{O}_3 - \text{SrO} - \text{CuO}$  system is dominated by the  $\text{Sc}_2\text{SrO}_4$  phase, which is in equilibrium with all other phases. This is not the case in  $\text{SRE}_2\text{O}_3 - \text{SrO} - \text{CuO}$  systems, where the  $\text{SRE}_2\text{Cu}_2\text{O}_5$  phase is in equilibrium with  $\text{Sr}_{14}\text{Cu}_{24}\text{O}_{41-\delta}$ .<sup>1</sup> We confirm that the  $\text{Sr}_{14}\text{Cu}_{24}\text{O}_{41-\delta}$  phase is slightly Cu-deficient<sup>2</sup>, its formulation being closer to  $\text{Sr}_{14}\text{Cu}_{23.5}\text{O}_{41-\delta}$ .

While all rare-earth elements substitute on the Sr sites in the  $\text{Sr}_{14}\text{Cu}_{24}\text{O}_{41}$  phase, Sc appears to partially replace Cu instead. This difference can be understood on the basis of ion size considerations. The solubility limit of Sc is low and amounts to about 2 at%. This substitution results in a shrinkage of the c-axis (running along the chains and ladders of the structure) by 0.3%.



**Fig. 1.** Phase equilibria in the  $\text{Sc}_2\text{O}_3 - \text{SrO} - \text{CuO}$  system at  $900^\circ\text{C}$  in air

## REFERENCES

1. W. Wong-Ng et al., *Int. J. Inorg. Mater.* **3** (2001) 1283
2. E.M. McCarron et al., *Mat. Res. Bull.* **23** (1988) 1355